Heald Street Bridge
Spanning Conrail Railroad on South Heald Street
(U.S. Route 13)
Wilmington vicinity
New Castle County
Delaware

HAER No. DE-27

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
Mid-Atlantic Regional Office
National Park Service
U.S. Department of the Interior
Philadelphia, Pennsylvania 19106

HAER
DEL
2-WILM.V,
6—

HISTORIC AMERICAN ENGINEERING RECORD

Heald Street Bridge

HAER No. DE-27

Location:	Spanning Conrail Railroad on South Heald Street (U.S. Route 13), 0.5 miles north of the intersection of U.S. Route 13 and I-495, in south Wilmington vicinity, New Castle County, Delaware. UTM: 18.451250.440725 Quad: Wilmington South, Delaware
Date of Construction:	June 23, 1941 - August 20, 1942
Builder:	Delaware Department of Transportation
Present Owner:	Delaware Department of Transportation P.O. Box 778 Dover, DE 19903
Present Use:	Vehicular and pedestrian bridge
Significance:	The Heald Street Bridge is a multiple span, embellished example of a concrete encased steel girder bridge. This commonly built type exemplifies the continuing expansion and improvement of the road network under the auspices of the Delaware State Highway Department. The department had assumed responsibility for construction and maintenance of all local roads in 1935; between 1935 and 1942, efforts focused on the improvement of rural roads and increasing road construction in towns and cities. Over 250 bridges were built during this period statewide; most were simply configured and unembellished. The Heald Street Bridge is an exceptional example of this type.
Project Information:	This documentation was undertaken in April 1990 in accordance with a Memorandum of Agreement by the Federal Highway Administration as a mitigative measure prior to the rehabilitation of the bridge. Rehabilitation work will involve rebuilding deck and replacing parapet walls.explored.
Report prepared by:	Therese M. Fulmer Environmental Planner Location & Environmental Studies Department of Transportation Dover, DE 19903

The Heald Street Bridge was constructed as a grade crossing elimination, the structure carries South Heald Street over the Pennsylvania Railroad presently owned and operated by ConRail Railroad. this multiple span, highly embellished example of a concrete-encased steel girder and concrete slab bridge is significant for its multiple spans, architectural treatment and the structural configuration of its slab spans.

Delaware Department of Transportation records state that the Heald Street Bridge was built in 1942. A plaque on the bridge states that it is named in memory of Paul F. Livingston "Born 1895 Died 1963, Delaware Legislator 1953-1963." Drawings on file at the Delaware Department of Transportation document the details of design, materials, and construction for this structure. These drawings, dated August 1940, indicate that the bridge was designed under Delaware State Highway Department Contract Number 700 and was a federally-aided project {Federal Aid Project No. FAGM 117-f(3)]. The structure carried Heald Street over the Shellpot Branch of the Pennsylvania Railroad; the drawings note that plans were approved by the Pennsylvania Railroad Office of Engineering for Bridges and Buildings on December 19, 1940. The structure was designed in accordance with American Association of State Highway Officials (AASHO) specifications of 1935 for H-20 loading, (AASHO was the predecessor to today's AASHTO) with some modifications of the flat slab portions. H-20 loading represents the idealized weight distribution of a standard (18 wheeler) truck load. Bids were received June 11, 1941, and Contract #700 was awarded to J. A. Bader & Co., Inc. of Wilmington on June 23, 1941. The bridge opened on June 25th of the following year, and work was completed on August 20, 1942.

Repairs to the parapets were required in 1961 due to movement of the concrete deck caused by the skew of the bridge over the railroad. Twenty years use had created slab movement greater than an inch. This, in turn, applied pressure to the parapets and caused damage. The parapet, railings, columns, and curb, as well as the expansion rockers, were repaired in 1961 under contract #2028 at a total cost of $10,050.00. Maintenance repairs to the curb, sidewalk, and surface were accomplished in 1970 under Contract #70-04-009.

The present appearance of the bridge shows signs of deterioration. The entire deck and parapet area displays evidence of severe deterioration.

The Heald Street Bridge is a composite girder and slab structure, 21 spans in length, built on a twenty degree skew. The 34"-6" main span comprises 10 concrete-encased steel girders. The other spans are concrete slabs. the deck is 53'-6" wide and carries four lanes of traffic. The substructure consists of concrete abutments and U-shaped wing walls. The main span, the concrete-encased steel girder portion, is supported by concrete piers, while the slab spans are supported by individual concrete columns grouped in threes at each end.

The bridge features geometrical embellishment reflecting the influence of the Art Moderne movement of the period. The portals are marked by large concrete pylons with vertical striations and a chevron motif on their outer faces; these pylons formerly supported light standards and serve as support blocks for a metal railing which runs above the wing walls. The wing walls feature a pattern of incised horizontal lines. Each approach span is defined by large concrete blocks at either end, above the piers; a concrete parapet wall unites the blocks, with rectangular panels punctuated with diamond-shaped openings. Where the approaches meet the main span, the parapet steps up in a series of sloping setbacks to join pylons similar to those at the portals. The parapet of the main span is higher than that of the approach spans;

its upper section is decorated with incised horizontal lines. On the main span, diamond-shaped insets of glazed tile replace the openings found on the approach parapets. A steel rail continues the parapet above the wing walls.

The bridge is significant as a highly embellished multiple span example of a concrete bridge. Most concrete bridges surveyed in Delaware were single spans with little ornamentation. Steel girder and concrete slab bridges, like the small Delaware bridges inventoried, have been widely built in the U.S. for highway use throughout the twentieth century. As a class, by the 1930s, those commonly built bridge types represented an economical and expedient engineering solution which found broad application across the nation. In general, their treatment was handled in a formulaic manner, presenting a standardized and uninspired impression, rather than an aesthetic statement. Embellishment, when present at all, was limited to simple geometric designs, breaking up the visual mass of the solid concrete parapets. The ubiquitousness of steel girder and concrete slab bridges, and their non-innovative technological and aesthetic character, prompted engineering historian Carl Condit to observe the great number of these "commonplace structures" with "design and appearance so nearly uniform" made it difficult to select noteworthy examples. The results of the historic bridge survey in Delaware confirm the widely built numbers of simple small spans. This commonly built type exemplifies the continuing expansion and improvement of the road network under the auspices of the Delaware State Highway Department. The department had assumed responsibility for construction and maintenance of all local roads in 1935; between 1935 and 1942, efforts focused on the improvement of rural roads and increasing road construction in towns and cities. Over 250 bridges were built during this period statewide; most were simply configured and unembellished. Bridge 684 is an exceptional example among those surveyed.

In addition to these characteristics, the bridge's slab spans are late applications of an early twentieth century technological innovation more commonly used in building construction, the concrete slab on mushroom columns. The reinforced slab carried on round columns with flared capitals was first developed for building design by C. A. P. Turner in 1905.

Application of the mushroom column and concrete slab to bridge construction occurred shortly after that. As the scientific understanding of reinforcement increased in the twentieth century the form evolved to include a beam which connected cylindrical columns and to the commonly-used pier form more typically seen in mid-twentieth century bridge design.

BIBLIOGRAPHY

Mack, Warren W. "A History of Motor Highways in Delaware" in Reed," Henry Clay, Delaware: A History of the First State, vol. 2, pp. 535-550. New York: Lewis Historical Publishing Co., 1947.

Delaware State Program. Delaware State Highways: The Story of Roads in Delaware. Wilmington, DE: 1919.

Federal Writers' Project. Delaware: A Guide to the First State. New York: Viking Press, 1938.

"Plans on file at Delaware Department of Transportation: Contract #700, 2028, 70-040-09.

LOCATION MAP

HEALD STREET BRIDGE

NEW CASTLE COUNTY, DELAWARE